



FAME S/C Bus Review FAME WBS 5.0

**August 15-16, 2001
Naval Research Laboratory**



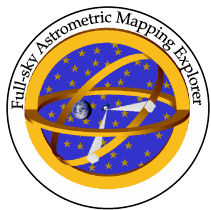
Meeting Objectives

- **FAME Cost Growth History/Budget Targets**
- **Review Status of Requirements De-Scopes/Design Changes**
- **Review S/C Bus Cost Summary Information**
 - **Cost Reductions/Estimates by WBS element**
- **Develop list of Additional Cost Reductions**
 - **Evaluate Associated Risks [Future Work]**
- **Schedule/Path to Determine Baseline Approach**
- **Subsystem Reviews**
 - **DeScope Options**
 - **Baseline Designs**
 - **Issues**



FAME Cost History

June 1999 to June 2001



FAME Phase A Cost Estimates

- **WBS 1.0 PI/PM \$15.3M**
 - **WBS 2.0 GND Dev. \$6.7M**
 - **WBS 3.0 Science \$2.96M**
 - **WBS 4.0 Instr. \$37.8M**
 - **WBS 5.0 S/C Bus \$39.5M**
 - **WBS 6.0 Integration \$2.5M**
 - **WBS 7.0 LV \$54.8M**
 - **WBS 8.0 Operations \$5.4M**
 - **WBS 9.0 E/PO \$2.1M**
 - **Total \$167.2M**
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- **Launch Scheduled for June '04**
 - **Real Year Dollars/Delayed Start**



FAME Cost Estimate - Feb 2001

- **WBS 1.0 PI/PM \$21.5M**
 - **WBS 2.0 GND Dev. \$8.0M**
 - **WBS 3.0 Science \$3.8M**
 - **WBS 4.0 Instr. \$47.7M**
 - **WBS 5.0 S/C Bus \$48.0M**
 - **WBS 6.0 Integration \$2.9M**
 - **WBS 7.0 LV \$60.7M**
 - **WBS 8.0 Operations \$7.6M**
 - **WBS 9.0 E/PO \$2.1M**
 - **Total \$202.0M**
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- **STP funds of \$4.5M not included.**
 - **Launch Delayed to October '04 due to NASA Funding Constraints**
 - **Includes Additional Requirements for SW IV&V, Red Team Support & Reliability Analysis**



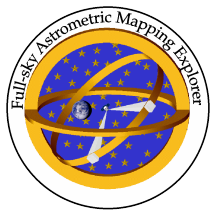
FAME Cost Estimate - June 2001

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|-----------|-------------|----------|
| • WBS 1.0 | PI/PM | \$19.7M |
| • WBS 2.0 | GND Dev. | \$8.3M |
| • WBS 3.0 | Science | \$3.5M |
| • WBS 4.0 | Instr. | \$79.7M |
| • WBS 5.0 | S/C Bus | \$55.8M |
| • WBS 6.0 | Integration | \$3.8M |
| • WBS 7.0 | LV | \$60.9M |
| • WBS 8.0 | Operations | \$7.7M |
| • WBS 9.0 | E/PO | \$2.1M |
| • Total | | \$241.5M |
- STP funds of \$4.5M not included.
 - Launch Delayed to June '05 (late delivery of optics/instrument)



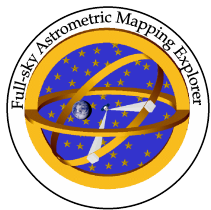
Target Costs (Phase B-E)

WBS		CSR	Jun-01	Cost Delta	Target	Delta
1.0	PI/PM	15.3	19.7	4.4	192	3.9
2.0	GND Dev.	6.7	8.3	1.6	8	1.3
3.0	Science	2.96	3.5	0.54	3.5	0.54
4.0	Instr.	37.8	79.7	41.9	51.8	14
5.0	S/C Bus	39.5	55.8	16.3	39.5	0
6.0	Integration	2.5	3.8	1.3	3.8	1.3
7.0	LV	54.8	60.9	6.1	60.9	6.1
8.0	Operations	5.4	7.7	2.3	7.7	2.3
9.0	E/PO	2.1	2.1	0	2.1	0
Total.		167.1	241.5	74.44	196.5	29.4
Minus STP						4.5
Projected Over-run						24.9



July 2001 Requirements Relaxation

- **Reduce Operational Sun Angle**
 - **From: 45 +/- 5 Degrees**
 - **To: 35 +/-5 Degrees**
- **Reduce Entrance Aperture Size by 50%**
 - **From: 56 X 13 cm**
 - **To: 40 X 9 cm**
- **Reduce Focal Length by 30%**
 - **From: 15 m**
 - **To: 11 m**
- **Reduce Number of CCD's**
 - **From: 24**
 - **To: 13 (11 Astrometric, 2 Photometric)**
- **Reduce Cross Scan and In Scan Requirements by 30%**
- **Reduce Downlink Data-Rate by 50% (500 kbps max)**
- **Bring Launch Date Back to November 2004**



Instrument Revised Requirements (1 of 2)

- **Control Volume : 73.0 inch diameter 17.75 inches height cylinder with a cone on top having a bottom diameter of 73.0 inches, a top diameter of 45.0 inches and a half angle of 40 degrees.**
- **Mounting Flexures: 3.0 inches in height maximum and have a 71.0 inches diameter bolt pattern to the SC Bus.**
- **Center of Gravity (CG): 12 inches (TBR) maximum above the Instrument to Bus interface plane and 0.2 inch off the Instrument's geometric axis centerline.**
- **Transverse Inertias: I_{xx} and I_{yy} shall not be more than 20% (TBR) greater in value between the two.**
- **Spin Inertia: I_{zz} shall be 10% (TBR) or greater in value than either transverse inertias.**
- **Mass: Not to exceed 500 lbm.**
- **Thermal: The Instrument shall be able to operate with a 10.0 square foot electronics deck radiator on the SC Bus looking in the +Z direction outside the cylinder of the control volume operating at 0 to +40 C degrees.**



Instrument Revised Requirements (2 of 2)

- **Power Allocation (Not to exceed including Contingency)**

• <u>Mission Phase</u>	<u>Power (Watts @ 30V)</u>
• Launch	0.0
• GTO	72.6
• Super Sync	72.6
• GEO-Early GEO	291.8
• GEO-Science	219.2
• GEO-Science (Focus)	263.2
• Safe Hold Mode	65.7